FERDI

Voters Response to Natural Disasters Aid: Quasi-Experimental Evidence from Drought Relief Payment in Mexico

➜ Alan FUCHS, Poverty and Equity Global Practice, afuchs@worldbank.org

➜ Lourdes RODRIGUEZ-CHAMUSSY, World Bank, Poverty and Equity Global Practice, lrodriguezchamussy@worldbank.org

Abstract

We estimate the effect of a government climatic contingency transfer allocated through the recently introduced rainfall indexed insurance on Presidential election returns in Mexico. Using the discontinuity in payment based on rainfall accumulation measured on local weather stations that slightly deviate from a pre-established threshold, we show that voters reward the incumbent presidential party for delivering drought relief compensation. We find that receiving indemnity payments leads to a significant average electoral support for the incumbent party of approximately 7.6 percentage points. Our analysis suggests that the incumbent party is rewarded by disaster aid recipients and punished by non-recipients. This paper provides evidence that voters evaluate government actions and respond to disaster spending contributing to the literature on retrospective voting.

Are there electoral returns to government disaster aid? This is a central question in terms of political accountability in democratic societies and has recently attracted scholarly attention in political economy.

Identifying the effect of government transfer policies --such as disaster relief-- on individual political behavior is a challenging task. A set of growing literature provides empirical evidence of a positive electoral effect of government provision of economic benefits (Manacorda, Miguel and Vigorito 2010; Pop-Eleches and Pop-Eleches 2009; Litschig and Morrison 2009; Rodriguez-Chamussy 2009). However, assessing voter's response to compensation received after a natural contingency imposes additional difficulties. In effect, empirical studies trying to test voter responsiveness to disaster aid face at least three types of problems. First, the targeting of relief action and resources may not be exogenous as politicians might target public resources towards swing voters or channel resources to core supporters as a reward to their loyalty. Second, even when the natural shock producing adverse effects for the population may be exogenous, the extent of the damages and losses is potentially endogenous as vulnerability to natural catastrophes may differ among localities and populations. Finally, there are several confounding factors interacting with government disaster spending (media coverage, actions of NGOs and volunteer aid, etc.) and some of these may cancel out estimates of a potential effect of relief transfers.

In this paper we use a quasi-experimental approach to provide evidence on the electoral effect of government economic transfers as compensation for the damage caused by a natural shock: severe drought on rain-fed agricultural regions. Exploiting the discontinuity in payment of a government funded climatic contingency aid program in Mexico, we show that voters re-ward the incumbent presidential party for delivering drought relief compensation. In 2005, after a severe drought the Mexican Federal Government delivered for the first time drought compensation payments under the Weather Index Insurance program. Provided that the Weather Index Insurance program was designed to allocate indemnity payments according to a strictly defined pre-established rainfall cutoff, we employ a regression discontinuity (RD) design to compare outcomes across electoral sections that were covered during 2005 by the insurance program and had similar levels of rainfall but differed in whether they experienced government aid in the form of a monetary transfer or not. This enables us to address the possibility of omitted variable bias between recipients of relief compensation and their counterparts who experienced a drought but did not qualify for compensation.

The basic regression model used through the analysis is given by equation (1):

$$Vote_i = \delta BelowCutoff_i + f(rainfall_i) + \beta X_i + \varepsilon_i$$

where $Vote_i$ represents the electoral outcome of interest – the share of votes for the incumbent party – in the electoral unit i.
$BelowCutoff_i$ is an indicator variable equal to 1 if the accumulated rainfall during the sowing season is less than the minimum cutoff for the program, and 0 otherwise. The main coefficient of interest in the analysis is δ, which indicates the effect of being in an area that corresponds to receiving government aid after a drought on the relevant outcome. The term $f(rainfall_i)$ denotes a smooth function of rainfall, which is the forcing variable in the context of this regression discontinuity design.

Finally, X_i includes a set of control variables such as a dummy for each state, municipality average per capita income, average temperature mea-

sured by weather station, distance from the electoral section to the weather station, distance to the nearest river and distance to the *cabecera*.[1] Although units on each side of the discontinuity experienced similar rainfall levels, it is important to include these control variables since they are not necessarily geographically located next to each other. Table 1 (see page 5) shows that units in which payments were disbursed are located in wealthier municipalities but all other characteristics do not appear to be statistically different for electoral sections below and above the cutoff. Particularly, the average share of votes for the Presidential incumbent in the previous election – year 2000 – is not statistically different for the two groups.

To get a sense of the way in which observations distribute on each side of the discontinuity we consider Figure 1 (see page 6), which plots the level of rainfall normalized to the defined threshold in each electoral section and the corresponding share of votes for the incumbent in the 2006 Presidential elections. The non-parametric regression line jumps down at the discontinuity suggesting an effect of the drought compensation payment on voting behavior. In order to explore the significance and magnitude of this apparent effect we first specify a linear model of $f(rainfall_i)$ and we allow it to vary on either side of the discontinuity.

Table 2 (see page 6) shows the results of estimating Equation (1) using OLS. Column (1) presents the results when no controls are used in the estimation. The coefficient for *cutoff* remains positive and stable as we add co-ntrols. Column (2) shows the estimates when we include a set of dummy variables for each state. Column (3) presents the results when we include also controls at the electoral section level such as altitude, distance from the weather station, distance to

the nearest river and distance to the "cabecera". Finally, Column (4) presents the estimates when controls at the municipal level are introduced. These specifications indicate a statistically significant effect of government disaster spending on the share of votes for the Presidential incumbent party. The magnitude of the coefficient decreases slightly once we control for the state and the characteristics of the electoral units and municipalities. With the full set of controls, our estimate suggests that receiving drought compensation had an effect of approximately 7.6 percentage points increase in the share of votes for the incumbent party.

Our study builds on the empirical literature about electoral accountability and retrospective voting by providing at least two key contributions. First, we analyze a specific policy that provides indemnity payments to small-scale farmers if the amount of accumulated rainfall within a specific time period falls below an exogenous and pre-established threshold. This allows the use of a quasi-experimental approach – using regression discontinuity design – to credibly identify causal effects of government transfers on electoral results. Moreover, studying the case of the Mexican Weather Indexed Insurance (WII) allows us to compare voter response in areas that have similar and comparable levels of vulnerability. Second, we collected, constructed and use electoral data at the lowest aggregation level: the electoral section. Multiple confounding factors potentially make difficult to identify an effect of disaster spending even with the use of panel data; in our setting these are minimized as we use small units of analysis and compare electoral outcomes of a single election. To the best of our knowledge, this is the first study that exploits the key features of a weather-indexed insurance scheme using GIS methods to produce a complete dataset allowing the empirical test of voter's response to government disaster spending. Evidence in the context of develop-

---

1. "Cabecera" refers to the Municipal seat. It generally corresponds to the biggest town in the municipality and the better connected in terms of transportation and information.

4

ing countries is very limited with the exception of India (Cole, Healy and Werker, 2009). Our findings complement the existing literature and are consistent with the results in previous studies for the US context (Healy and Malhotra 2009, Chen 2009, Chen 2008) and Germany (Bechel and Hainmueller, 2010).

▶ References

- **Achen, C. H.** and **L. M. Bartels**. 2002. "Blind Retrospection: Electoral Responses to Drought, Flu and Shark Attacks". Paper presented at the annual meeting of the American Political Science Association, Boston.

- **Agroasemex**. 2006. "La Experiencia Mexicana en el Desarrollo y Operación de Seguros Paramétricos Orientados a la Agricultura." Working Paper, April 19, 2006. http://www.agroasemex.gob.mx

- **Bechtel, M.** and **J. Hainmueller**. 2011. "How Lasting is voter Gratitude: An Analysis of the Short-term and Long-term Electoral Returns to Beneficial Policy". *American Journal of Political Science*, 55(4): 852-868.

- **Chen, J.** 2013. "Voter Partisanship and the Effect of Distributive Spending on Political Participation". *American Journal of Political Science*. 57(1): 200-217.

- **Cole, S.**, **A. Healy** and **E. Werker**. 2012. "Do Voters Demand Responsive Governments? Evidence from Indian Disaster Relief". *Journal of Development Economics*. 97(2012) 167-181.

- **De La O, A. L.** 2013. "Do Conditional Cash Transfers Affect Electoral Behavior? Evidence from a Randomized Experiment in Mexico". *American Journal of Political Science*, 57(1): 1-14.

- **Fiorina, M. P.** 1978. "Economic Retrospective Voting in American National Elections: A Micro-Analysis", *American Journal of Political Science,* 22(2): 426–443.

- **Fuchs, A.** and **H. Wolff.** 2011. "Concept and Unintended Consequences of Weather Index Insurance: The Case of Mexico." *American Journal of Agricultural Economics*, 93(2): 505-511.

- **Fuchs, A.** and **H. Wolff.** 2011. "Drought and Retribution: Evidence from a large scale Rainfall Indexed Insurance Program in Mexico", *University of California Berkeley Working Paper*.

- **Hazell, P.**, **J. Anderson**, **N. Balzar**, **A. Hastrup Clemmensen**, **U. Hess** and **F. Rispoli.** 2010. *Potential for scale and sustainability in weather index insurance for agriculture and rural livelihoods*. International Fund for Agricultural Development and World Food Programme. Rome

- **Healy, A.** and **N. Malhotra.** 2009. "Myopic Voters and Natural Disaster Policy", *American Political Science Review,* 103(3): 357–406.

- **Healy, A.** and **N. Malhotra.** 2010. "Random Events, Economic Losses, and Retrospective Voting: Implications for Democratic Competence", *Quarterly Journal of Political Science*, 5(2).

- **Lay, C. J.** 2009. "Race, Retrospective Voting, and Disasters: The Re-Election of C. Ray Nagin after Hurricane Katrina", *Urban Affairs Review,* 44(5): 645–662.

- **Litschig, S.** and **K. Morrison.** 2012. "Government Spending and Re-election: Quasi-Experimental Evidence from Brazilian Municipalities". *Barcelona GSE Working Paper Series* nº 515.

- **Manacorda, M.**, **E. Miguel** and **A. Vigorito**. 2011. "Government Transfers and Political Support". *American Economic Journal: Applied Economics*, 3(3): 1-28
- **Pop-Eleches, C.** and **G. Pop-Eleches**. 2009. "Government Spending and Pocketbook Voting: Quasi-Experimental Evidence from Romania".
- **Rodriguez-Chamussy, L.** 2014. "Local Electoral Rewards from Centralized Social Programs: Are Mayors Getting the Credit?" *IDB Working paper* n°555
- **Sobel, R.** and **P. Leeson.** 2006. "Government's Response to Hurricane Katrina: A Public Choice Analysis", *Public Choice,* 127(1): 55–73.

Table 1. Descriptive Statistics, electoral sections with insurance coverage in 2005

	Units WITH compensation	Units WITHOUT compensation
Altitude (meters)	1442.75 (43.48)	1554.19 (23.39)
Distance from weather station (meters)	1088.12 (30.66)	1042.5 (23.11)
Distance to cabecera (meters)	1792.98 (96.73)	1771.4 (123.10)
Distance to nearest river (meters)	526.2 (35.68)	582.88 (27.05)
Municipal infant Mortality	21.97 (0.12)	25.33 (0.13)
Municipal income per capita (pesos)	1821.82 (26.97)***	1233.51 (12.7)***
Number of votes, 2006	617.84 (23.06)	677.99 (11.75)
Share of votes for incumbent 2000	32.35 (1.08)	32.22 (0.48)
Number of votes, 2000	619.05 (19.69)	651.2 (9.08)
Observations	305	733

Standard errors for the t-test in parenthesis. Null hypothesis is average characteristic is equal for the two groups. *** Indicates the null is rejected at 1% confidence level.

Table 2. Effect of Drought Relief Compensation on Share of Votes for the Incumbent, Main Results

|	Dependent variable: Share of votes for incumbent in 2006			
	(1)	**(2)**	**(3)**	**(4)**
Below Cutoff	10.395 (1.421)***	8.211 (1.040)***	8.332 (1.219)***	7.69 (1.000)***
Rain Deviation	-0.078 (0.012)***	0.057 (0.015)***	0.045 (0.018)**	0.03 (0.018)*
Constant	45.188 (0.845)***	14.38 (3.574)***	-13.398 (10.258)	7.255 (9.071)
Observations	1038	1038	1038	1038
R-squared	0.12	0.78	0.79	0.82
State controls	No	Yes	Yes	Yes
Controls at electoral section level	No	No	Yes	Yes
Controls at municipal level	No	No	No	Yes
Mean of dependent variable	45.37	45.37	45.37	45.37

Robust standard errors in parentheses.
State controls are dummy variables for each state. Controls at the electoral sections include altitude, distance from the weather station, distance to the nearest river and distance to the "cabecera". Controls at the municipal level include municipal income per capita for the year 2000.
* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1. Non-parametric graphic analysis, share of votes for the incumbent in electoral sections with insurance coverage in 2005
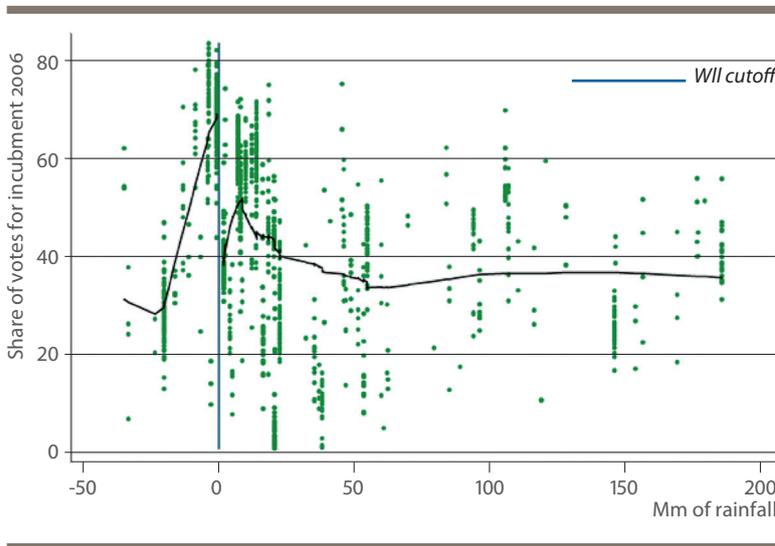
FERDi

Created in 2003 , the **Fondation pour les études et recherches sur le développement international** aims to promote a fuller understanding of international economic development and the factors that influence it.

↳ **Contact**